**Career Academy Integrated Unit Plan**

**Academy Name: HEMS**  **School: Atlantic HS**

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| Integrated Unit Plan Title: Municipal Water Purification |
| Courses to integrate: Chemistry 1 Honors and Horticultural Science 2 |
| Grade Level: 10 / 11 |
| Timeline & Duration: See course syllabus (approximately three weeks) |

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| Unit Summary: “H2Woes”  In this project-based case study student teams will investigate the fresh water needs of three communities in Latin America, supposedly for a UNESCO-funded effort to upgrade their infrastructure. Each situation has different geology, a different contaminant, and presents different water-purification challenges. The student teams must reach a consensus on how to approach each situation and develop a decision briefing to win support for their solution.  The eight learning activities in the chemistry class provide the knowledge base to enable the students to design a water-purification scheme to fit the situation and explain it to the class, who function as the management structure at UNESCO.  The learning activities include readings, problem solving, and laboratory investigations on the following chemistry content: solubility factors, periodic trends, carcinogens, precipitation reactions, chemical bonding, spectral absorption, ion-specific electrodes, electrostatic forces, ionic equilibria, the Tyndall Effect, laws of thermodynamics, Hess’s Law, toxicity limits, chlorination of water, reaction rates, order and disorder, suspensions, and solubility-product constants. |

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| **Overview of Activities/Lessons per Course** | | | | |
| Course | Chem 1 Honors | Hort 2 | Marine Science I |  |
| Activity / Lesson | What’s in Natural Water? | Hydrologic Cycle |  |  |
| Activity / Lesson | Factors Affecting Solubility of Solids | Soil types and materials  The nutritional needs of plants |  |  |
| Activity / Lesson | How Much Solute is in the Water? | Fundamental water needs in plants  Effects of salinity levels on plant growth and health. |  |  |
| Activity / Lesson | Aqueous Balance: Equilibrium | Osmosis  Transportation Mechanisms in Plants |  |  |
| Activity / Lesson | Removing Suspended Particles and Iron | Fertilizers |  |  |
| Activity / Lesson | Water Softening | Salinity and Salt-Water Intrusion |  |  |
| Activity / Lesson | Removing Toxic-Metal Ions | Trace Minerals and Plant Health |  |  |
| Activity / Lesson | Disinfection | Water-borne Diseases  Public Health  Agricultural Effluents |  |  |
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**Lesson Instructions for Hort 2**

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| **Standards (Performance Tasks or Course Frameworks or Sunshine State Standards ):**  **Rigor & Relevance (quadrant):** |
| **Instructions to Teacher:** (1) |
| **Instructions to Students: (1)** |
| **Instructions for Student Accommodations:** |
| **Assessment for Activity:** |
| **Approximate Length of Time for Activity:** |
| **Materials Needed:** |
| **Resources Needed:**  **LCD projector, PC, etc.** |
| Attachments: |

**Lesson Instructions for Chemistry 1 Honors:**

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| **Standards (Performance Tasks or Course Frameworks or Sunshine State Standards ):** See 2009-2010 Volusia County Chemistry 1 Honors Curriculum Map.  **Rigor & Relevance (quadrant):** stepwise, 1 through 4 |
| **Instructions to Teacher:**  See textbook and ancillary materials for detailed instructions. “Active Chemistry,” 2007. It’s About Time, Inc. |
| **Instructions to Students:**  (These activities are highly detailed. See student text. |
| **Instructions for Student Accommodations:**  Teacher materials provided include very detailed suggestions for various solving challenges in meeting student needs. |
| **Assessment for Activity:**  Activity quizzes, chapter test, lab activities and analysis, student-group presentation at conclusion of unit. |
| **Approximate Length of Time for Activity:**  Two to three weeks. |
| **Materials Needed:**  Considerable list. See teacher ancillary materials. |
| **Resources Needed:**  If community resources are available, it would be very appropriate to have guest speakers from local water authorities and private water treatment firms in to talk about current issues in water availability for all purposes and the challenges of the local area in meeting the needs of all stakeholders. |
| Attachments: |